

Cereal Grains

**Evaluation,
Value Addition
and Quality
Management**

D.C. Saxena

C.S. Riar

S. Singh

N. Jindal



Cereal Grains

EVALUATION, VALUE ADDITION AND QUALITY MANAGEMENT

D.C. Saxena

Professor

Department of Food Engineering & Technology, SLIET
Longowal-148 106
Sangrur, Punjab

C.S. Riar

Associate Professor

Department of Food Engineering & Technology, SLIET
Longowal-148 106
Sangrur, Punjab

Sukhcharn Singh

Associate Professor

Department of Food Engineering & Technology, SLIET
Longowal-148 106
Sangrur, Punjab

N. Jindal

Assistant Professor

Department of Food Engineering & Technology, SLIET
Longowal-148 106
Sangrur, Punjab



NEW INDIA PUBLISHING AGENCY

New Delhi – 110 034



NEW INDIA PUBLISHING AGENCY

101, Vikas Surya Plaza, CU Block, LSC Market

Pitam Pura, New Delhi 110 034, India

Phone: + 91 (11)27 34 17 17 Fax: + 91(11) 27 34 16 16

Email: info@nipabooks.com

Web: www.nipabooks.com

Feedback at feedbacks@nipabooks.com

© **Editors, 2013**

ISBN: 978-93-81450-85-7

All rights reserved, no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior written permission of the publisher or the copyright holder.

This book contains information obtained from authentic and highly regarded sources. Reasonable efforts have been made to publish reliable data and information, but the author/s, editor/s and publisher cannot assume responsibility for the validity of all materials or the consequences of their use. The author/s, editor/s and publisher have attempted to trace and acknowledge the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission and acknowledgements to publish in this form have not been taken. If any copyright material has not been acknowledged please write and let us know so we may rectify it, in subsequent reprints.

Trademark notice: Presentations, logos (the way they are written/presented), name of the material and author/s, editor/s details in this book are under the trademarks of the publisher and hence, if copied/resembled the copier will be prosecuted under the law.

Composed, Designed and Printed in India

Contents

<i>Foreword</i>	<i>V</i>
<i>Preface</i>	<i>ix</i>
<i>Contributors</i>	<i>xv</i>

Section – I **Quality Strategies Approaches and Management**

1. Total Quality Management and Food Safety	3
<i>H.P.S. Nagi and Savita Sharma</i>	
2. Wheat Protein Composition and its Relation to Quality of Indian Traditional Products	11
<i>U.J.S. Prasada Rao</i>	
3. Development of Testing Protocol for Processing Machinery to Enhance Grain Quality	17
<i>R.K. Gupta and R.K. Vishwakarma</i>	
4. Mycotoxins in Cereal Grains	25
<i>Deepa Srivastava, Tanuja Srivastava, C.S. Riar, Sukhcharn Singh and D.C. Saxena</i>	
5. IPR Issues — Scenario of Indian Universities and Institutions	37
<i>K.A. Anu Appaiah</i>	

Section – II **Quality Evaluation of Grains and its Constituents**

6. Adulteration in Cereal Grains: An Overview	45
<i>G.S.Padda, Amarjeet Kaur and Poonam A. Sachdeva</i>	
7. Quality Evaluation of Bakery Flour	51
<i>Amarjeet Kaur, G.S. Padda and Umesh Kamble</i>	
8. Functionality of Wheat Gluten Proteins	59
<i>Bhupendar Singh Khatkar</i>	
9. Emerging Technology in Quality Evaluation	69
<i>S.N. Jha</i>	

- 10. Water Absorption Characteristics of Green Gram and Black Gram 79**
Monesh, M. Pethe, Jagdish, S. Nikhade, V.B. Kalmegh

Section – III Value Addition

- 11. Use of Emerging Technologies in Evaluating Wheat Genotypes for their Suitability for Value Addition Qualities 87**
J.P. Jaiswal, Sohan Pal, D.P. Saini and Archana Vaishnava
- 12. Strategies for Nutrient Fortification of Wheat Flour and Bakery Product 97**
Alok Kumar Srivastava
- 13. Value Addition in Wheat Through Identification of Genotypes for Biscuit Making Qualities 105**
Archana Vaishnava, Sohan Pal, D.P. Saini and J.P.Jaiswal
- 14. Effect of Specific Gravity Separation on the Quality of Paddy (*Oryza sativa* L.) Seeds During Storage 113**
Satish Kumar, Sadhna Arora, V.K. Sehgal and Sapanpreet Kaur
- 15. Effect of Pea Grits on the Extrusion Cooking of Rice-Pea Blends 121**
Baljit Singh and H.P.S. Nagi

Section – IV Post Harvest Plant Operations and Quality Management

- 16. Quality Management in Post-harvest Operation of Food Grains 129**
S.M. Ilyas and R.K. Goyal
- 17. Strategies for Upgrading Quality of Food Grains at Competitive Cost During Storage and Handling 147**
Rajinder Singh
- 18. Post-Harvest Management of High Moisture Paddy in Punjab ... 159**
V.K. Sehgal, V.K. Thapar, M.S. Alam, M. Arora, D.K. Sharma and P.C. Grover
- 19. Improvement in Sunflower (*Helianthus annus* L.) Seed Quality in Marginal Lots by Specific Gravity Separator 165**
Satish Kumar, Sadhna Arora, V.K. Sehgal and Sanjeev Uppal

Section – V Product Development: Status and New Strategies

- 20. Plant Breeding – An Orientation Towards End Product Quality . 175**
A.K. Bakshi and G.S. Mahal

- 21. Physico-Chemical, Milling and Rheological Characteristics of Indian Wheat and Triticales for Pretzel Making 181**
H.R. Naik, K.S. Sekhon, H.P.S. Nagi, and G.M. Beigh
- 22. Newer Products: Potential Utilization of Cereals 195**
Savita Sharma, HPS Nagi, H Kaur and R Kaur
- 23. Reproducible Textural Characterisation of Commercial Biscuit 201**
Bhaskar Janve, Harsimran Singh, Manoj Pandey and K. Prasad

Section – VI

Storage and Handling

- 24. An Overview on Grain Storage Management Systems 209**
Sanjay Kumar Jain, N. Jindal and R.C. Verma
- 25. Management to Maintain Stored Grain Quality 223**
Deepa Srivastava, Tanuja Srivastava, Sukhcharn Singh, C.S. Riar and D.C. Saxena
- 26. Storage of Pulses Under Modified/Controlled Atmospheres 241**
Gagandeep Singh and D.S. Sogi
- 27. Indigenous Grain Storage Practices Used By Rural Women 247**
Geeta Thakur, Gayatri and C.S. Singh

Section – VII

Grading and Trends of Milling Industries

- 28. Indian Grain Market - Effect of WTO 253**
A.S. Bawa
- 29. A Survey of Wheat Milling Units (Atta Chakki) in Delhi 261**
Amar Singh, S.K. Jha, B.C. Srivastava, A. Pandeya and R.B. Gautam
- 30. Grading of Grains - Its Evolution and Need 269**
P.N. Maheshwari
- Index 283**

Cereal Grains

Evaluation, Value Addition and Quality Management

Readership: useful for cereal technologists, scientists, chemists, and processors of food grains and the persons involved in the quality management of grains. The book will be highly needful for the researchers, industries and those entire academicians related to the quality of grain and further product development.

The book contains articles contributed by experts from various parts of the country from research institutes like CFTRI, DRFL, SLIET, CIPHET, ICAR, PAU etc..

This book will be a valuable addition to the literature on food grains that has been designed systematically to include basis and advanced knowledge on quality management in addition to the collection of articles in the fields of:

Cereals Grains: Quality Strategies, Approaches and Management ■ Quality Evaluation of Grains and its Constituents ■ Value Addition ■ Post Harvest Plant Operations and Quality Management ■ Product Development Status and New Strategies ■ Storage and Handling ■ Grading and Trends of Milling Industries

D.C. Saxena : Professor, Department of Food Engineering and Technology
SLIET, Longowol, Sangrur, Punjab

C.S. Riar : Associate Professor, Department of Food Engineering and Technology
SLIET, Longowol, Sangrur, Punjab

S. Singh : Associate Professor, Department of Food Engineering and Technology
SLIET, Longowol, Sangrur, Punjab

N. Jindal : Assistant Professor, Department of Food Engineering and Technology
SLIET Longowol, Sangrur, Punjab



NEW INDIA PUBLISHING AGENCY

101, Vikas Surya Plaza, CU Block, L.S.C. Market,
Pitam Pura, New Delhi - 110 034 (India)

Ph: +91-11-27 34 17 17, Fax: +91-11-27 34 16 16

Email: info@nipabooks.com

Website: www.nipabooks.com

ISBN: 978-93-81450-85-7

